

REMARKS

The specification has been amended to improve readability. Claims 1-16 are currently pending. Claims 1 and 9 have been amended for clarity. Applicants respectfully request reconsideration of the application in response to the final Office Action.

Allowable Subject Matter

Applicants note with appreciation the continued indication by the Examiner that claims 2-8 and 10-16 are allowable. In the present amendment, Claims 2, 4, 5, 7, 8, 12, 13, and 16 have been amended to correct typographical errors.

Claim Rejections – 35 U.S.C. §102

The Office Action repeats a rejection of claims 1 and 9 under 35 U.S.C. §102(b) as allegedly being anticipated by the Nakamura et al. patent (U.S. Patent 6,798,807). This rejection is respectfully traversed.

As discussed in the previous amendments filed on September 25, 2006 and March 6, 2007, the presently claimed invention addresses the problems associated with scribing light emitting surfaces. When light emitting surfaces are scribed, a cleavage plane is formed on the light emitting side. However, particularly when a ridge waveguide structure is formed on the upper cladding, a scribing force is transferred from the sapphire substrate to a lower portion of the mesa structure and the ridge at the upper portion of the mesa structure, resulting in the scribing force being too concentrated, thus resulting in non-uniform cleavage planes. In other words, the shapes of the cleavage planes are different from chip to chip even when

the chips are manufactured on the same scribing conditions. When scribing the mesa structure, by transferring the scribing force from the sapphire substrate to the mesa structure, the scribing force is concentrated on a lower corner of the mesa structure so that cracks occur at the lower corner of the mesa structure as shown in the dotted triangle of Figure 3, for example. Here the cracks are transferred to the light exiting surface. Various cracks in the rough cleavage plane result in the decreased optical output and an increased operating current.

The presently claimed invention can address these types of problems. Specifically, as recited in claim 1, for instance, the semiconductor laser device includes a multi-semiconductor material layered mesa structure having a laser resonance layer on a substrate and cladding layers formed over and below the resonance layer. The semiconductor laser device includes rounded corners connected to the substrate, in a lower portion of the mesa structure. The rounded corners are represented by 121a in an exemplary embodiment.

Claim 9 is similar to claim 1, but recites that the current injection ridge is accompanied by force distribution ridges formed on an upper portion of the mesa structure, which protrude from the upper surface of the mesa structure, and which are represented by the current injection ridge 151a and the force distribution ridges 141b in Figures 5 and 6, for example.

With regard to the claim recitation "rounded corners connected to the substrate" in previous claims 1 and 9, the Office has stated that "it is impermissible the importation of subject matter into the claim. Therefore, claim 1 only recites 'rounded corners connected to the substrate' and cannot be limited to limitations disclosed in the specification." (Office Action, page 2). For emphasis of the original

claim recitations, claims 1 and 9 have been amended to include a recitation "rounded corners connected to the substrate, in a lower portion of the mesa structure and configured to prevent concentration of a scribing force" (emphasis added). Support for the changes can be found in the specification at page 8, line 3 - page 9, line 2.

Applicants respectfully submit that the inventions claims 1 and 9 are directed to are not anticipated by the applied art. A review of the prior art reveals that the applied art does not appreciate the problem of the prior art identified in the present application, nor does it suggest that rounded corners provide a solution to any problem, such as preventing concentration of a scribing force. The isolation trench 32 of the Nakamura et al. system is generated by merely etching multilayered semiconductor layer with a photoresist film 41a as an etching mask. Apparently, etching mask are used to transfer its planar pattern and the depth of etching is generally uniform within an engineering tolerance unless the width of the trench 32 is adjusted to generate a specific shape, such as a V-shaped trench in Figure 29 of the Nakamura et al. patent. There is no supporting disclosure suggesting that the rounded corner was intentional or actually apparent in the device as designed or made. As such, if the trench 32 has rounded corners, the rounded corners would simply represent technical by-product in etching the trench 32 of the Nakamura et al. system.

In light of the foregoing, Applicants respectfully submit that the applied art does not anticipate the present invention, and claims 1 and 9 are allowable.

Conclusion

Based on the reasons as set forth above, Applicants respectfully request allowance of all pending claims.


In the event that there are any questions concerning this paper, or the application in general, the Examiner is respectfully urged to telephone Applicants' undersigned representative so that prosecution of the application may be expedited.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY LLP

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By:


Charles F. Wieland III
Registration No. 33,096

P.O. Box 1404
Alexandria, VA 22313-1404
650 622 2300